DEALER SERVICE MANUAL

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Hydro Cut Series

13HP Walk-Behind Mower

Mfg. No. Description

Simplicity Models

1694562 Hydro Cut 1332, 13HP 32” Cut Walk-Behind Mower (CE)

Simplicity / Snapper / Ferris / Snapper Pro Models

5901182 HC32KAV13ECE, 13HP 32” Cut Walk-Behind Mower (CE)(2006)

Simplicity / Ferris / Snapper Pro Models

5900846 HC32RDKAV13ECE, 13HP 32” Rear Discharge Cut Walk Behind Mower (CE)

Snapper Pro Models

5900895 SP32RDKAV13ECE, 13HP 32” Rear Discharge Cut Walk Behind Mower (CE)

5900896 SP32KAV13ECE, 13HP 32” Cut Walk-Behind Mower (CE)

16HP Walk-Behind Mower

Mfg. No. Description

Ferris Models

5900989 HC32KAV16ECE, 16HP 32” Cut Walk-Behind Mower (CE)

5900990 HC32RDKAV16ECE, 16HP 32” Cut Rear Discharge Walk Behind Mower (CE)

Form No. 5102319
Revision M

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CE

Table of Contents

Safety Rules & Information 2
Identification Numbers 5
Safety Decals & Icons 6
Features & Controls 8
Control Functions 8
Safety Interlock System 10
Operation 11
General Operating Safety 11
Checks Before Starting 11
Starting the Engine 11
Driving the Mower 12
Operating On A Slope 12
Stopping the Mower 12
Mowing 12
Pushing the Mower by Hand 12
Storage 13
Starting After Long Term Storage 13
Regular Maintenance 14
Maintenance Schedule 14
Checking Tire Pressure 14
Checking/Adding Fuel 15
Fuel Filter 15
Oil & Filter Change 15
Check / Change Air Filter 15
Replace Spark Plug 15
Transmission Maintenance 15
Lubrication 16
Servicing the Mower Blades 17
Troubleshooting, Adjustments & Repair 18
Troubleshooting the Mower 18
Troubleshooting the Mower Deck 19
Cutting Height Adjustment 20
Deck Leveling Adjustment 21
Belt Removal and Replacement 22
Ground Speed Control Lever Adjustment 23
PTO Clutch Adjustment 24

NOTE: In this manual, "left" and "right" are referred to as seen from the operating position.

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⚠ WARNING

You must read, understand and comply with all safety and operating instructions in this manual before attempting to set-up and operate your machine.

Failure to comply with all safety and operating instructions can result in loss of machine control, serious personal injury to you and / or bystanders, and risk of equipment and property damage. The triangle in the text signifies important cautions or warnings which must be followed.

⚠ WARNING

Engine exhaust from this product contains chemicals known, in certain quantities, to cause cancer, birth defects, or other reproductive harm.

Safety Rules & Information

Read these safety rules and follow them closely. Failure to obey these rules could result in loss of control of unit, severe personal injury or death to you, or bystanders, or damage to property or equipment.

This mowing deck is capable of amputating hands and feet and throwing objects.

The triangle ⚠ in text signifies important cautions or warnings which must be followed.

GENERAL OPERATION

1. Read, understand, and follow all instructions on the machine and in the manual(s) before starting.
2. Do not put hands or feet near or under the machine. Keep clear of the discharge opening at all times.
3. Only allow responsible adults, who are familiar with the instructions, to operate this machine.
4. Clear the area of objects such as rocks,wire, toys, etc., which could be thrown by the blade. Stay behind the handle when the engine (motor) is running.
5. Be sure the area is clear of bystanders before operating. Stop machine if anyone enters the area.
6. Do not operate machine barefooted or while wearing sandals. Always wear substantial footwear.
7. Do not pull machine backward unless absolutely necessary. Always look down and behind before and while moving backward.
8. Never direct discharged material toward anyone. Avoid discharging material against a wall or obstruction. Material may ricochet back toward the operator. Stop the blade when crossing gravel surfaces.
9. Do not operate machine without the entire grass catcher, discharge guard, rear guard, or other safety protective devices in place and working.
10. Never leave a running machine unattended.
11. Stop the engine (motor) and wait until the blade comes to a complete stop before cleaning the machine, removing grass catcher, or unclogging the discharge guard.
12. Operate machine only in daylight or good artificial light.
13. Do not operate machine while under the influence of alcohol or drugs.
14. Never operate mower in wet grass. Always be sure of your footing; walk; never run.
15. Disengage the drive system, if so equipped, before starting the engine (motor).
16. If the machine should start to vibrate abnormally, stop the engine (motor) and check for the cause immediately. Vibration is generally a warning of trouble.
17. Always wear eye protection when operating machine.
18. See manufacturer's instructions for proper operation and installation of accessories. Only use accessories approved by the manufacturer.
19 Watch for traffic when operating near or crossing roadways.
20. Use extra care when loading or unloading the unit into a trailer or truck.
21. Always wear eye protection when operating this unit.
22. Data indicates that operators, age 60 years and above, are involved in a large percentage of power equipment-related injuries. These operators should evaluate their ability to operate the equipment safely enough to protect themselves and others from injury.
23. Keep in mind the operator is responsible for accidents occurring to other people or property.
24. All drivers should seek and obtain professional and practical instruction.
25. Before using, always visually check that the blades and blade hardware are present, intact, and secure. Replace worn or damaged parts.
26. Disengage attachments before: refueling, removing an attachment, making adjustments (unless the adjustment can be made from the operator's position).
27. Before leaving the operator's position for any reason, engage the parking brake (if equipped), disengage the blades (PTO), stop the engine, and remove the key.
28. To reduce fire hazard, keep the unit free of grass, leaves, & excess oil. Do not stop or park over dry leaves, grass, or combustible materials.
29. It is a violation of California Public Resource Code Section 4442 to use or operate the engine on or near any forest-covered, brush-covered, or grass-covered land unless the exhaust system is equipped with a spark arrester meeting any applicable local or state laws. Other states or federal areas may have similar laws.

TRANSPORTING AND STORAGE

1. When transporting the unit on an open trailer, make sure it is facing forward, in the direction of travel. If the unit is facing backwards, wind lift could damage the unit.
2. Always observe safe refueling and fuel handling practices when refueling the unit after transportation or storage.
3. Never store the unit (with fuel) in an enclosed poorly ventilated structure. Fuel vapors can travel to an ignition source (such as a furnace, water heater, etc.) and cause an explosion. Fuel vapor is also toxic to humans and animals.
4. Always follow the engine manual instructions for storage preparations before storing the unit for both short and long term periods.
5. Always follow the engine manual instructions for proper start-up procedures when returning the unit to service.
6. Never store the unit or fuel container inside where there is an open flame or pilot light, such as in a water heater. Allow unit to cool before storing.

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SLOPE OPERATION

Slopes are a major factor related to loss-of-control and tip-over accidents, which can result in severe injury or death. Operation on all slopes requires extra caution. If you cannot back up the slope or if you feel uneasy on it, do not operate on it.

Control of a walk-behind or ride-on machine sliding on a slope will not be regained by the application of the brake. The main reasons for loss of control are: insufficient tire grip on the ground, speed too fast, inadequate braking, the type of machine is unsuitable for its task, lack of awareness of the ground conditions, incorrect hitching and load distribution.

1. Mow across the face of slopes; never up and down. Exercise extreme caution when changing direction on slopes.
2. Watch for holes, ruts, bumps, rocks, or other hidden objects. Uneven terrain could cause a slip and fall accident. Tall grass can hide obstacles.
3. Choose a slow speed so that you will not have to stop or change speeds while on the slope.
4. Do not mow on wet grass or excessively steep slopes. Poor footing could cause a slip and fall accident.
5. Never mow down slopes.
6. Avoid starting, stopping, or turning on a slope. If tires lose traction (i.e. machine stops forward motion on a slope), disengage the blade(s) (PTO) and drive slow off the slope.
7. Keep all movement on slopes slow and gradual. Do not make sudden changes in speed or direction, which could cause a slip and fall accident.
8. Use extra care while operating machines with grass catchers or other attachments; they can affect the stability of the unit. Do not use on steeps slopes.
9. Do not mow near drop-offs, ditches, or embankments. You could lose your footing or balance.
10. Do not use grass catchers on steep slopes.
11. Do not mow slopes you cannot back up them.
12. Remove obstacles such as rocks, tree limbs, etc.
13. Use slow speed. Tires may lose traction on slopes even through the brakes are functioning properly.

⚠ WARNING

Operating on steep slopes can cause sliding and loss of steering, control and rollover.

Select slow ground speed before driving onto slope. Use extra caution when operating on slopes with rear-mounted grass catchers.

Mow across the face of slopes, not up and down,use caution when changing directions and DO NOT START OR STOP ON SLOPE.

CHILDREN

Tragic accidents can occur if the operator is not alert to the presence of children. Children are often attracted to the unit and the mowing activity. Never assume that children will remain where you last saw them.

1. Keep children out of the mowing area and under the watchful care of a responsible adult other than the operator.
2. Be alert and turn mower off if a child enters the area.
3. Never allow children to operate the machine.
4. Use extra care when approaching blind corners, shrubs, trees, or other objects that may block your view of a child.

EMISSIONS

1. Engine exhaust from this product contains chemicals known, in certain quantities, to cause cancer, birth defects, or other reproductive harm.
2. Look for the relevant Emissions Durability Period and Air Index information on the engine emissions label.

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REPAIR AND MAINTENANCE

To avoid personal injury or property damage, use extreme care in handling gasoline. Gasoline is extremely flammable and the vapors are explosive.

Safe Handling of Gasoline

1. Extinguish all cigarettes, cigars, pipes, and other sources of ignition.
2. Use only approved gasoline containers.
3. Never remove the gas cap or add fuel with the engine running. Allow the engine to cool before refueling.
4. Never fuel the machine indoors.
5. Never store the machine or fuel container where there is an open flame, spark, or pilot light such as near a water heater or other appliance.
6. Never fill containers inside a vehicle or on a truck bed with a plastic bed liner. Always place containers on the ground away from your vehicle before filling.
7. Remove gas-powered equipment from the truck or trailer and refuel it on the ground. If this is not possible, then refuel such equipment on a trailer with a portable container, rather than from a gasoline dispenser nozzle.
8. Keep nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete. Do not use a nozzle lock-open device.
9. If fuel is spilled on clothing, change clothing immediately.
10. Never over-fill the fuel tank. Replace gas cap and tighten securely.
11. Use extra care in handling gasoline and other fuels. They are flammable and vapors are explosive.
12. If fuel is spilled, do not attempt to start the engine but move the machine away from the area of spillage and avoid creating any source of ignition until fuel vapors have dissipated.
13. Replace all fuel tank caps and fuel container caps securely.

Repair & Maintenance

1. Never run the unit in an enclosed area where carbon monoxide fumes may collect.
2. Keep nuts and bolts, especially blade attachment bolts, tight and keep equipment in good condition.
3. Never tamper with safety devices. Check their proper operation regularly and make necessary repairs if they are not functioning properly.
4. Keep unit free of grass, leaves, or other debris build-up. Clean up oil or fuel spillage. and remove any fuel-soaked debris. Allow machine to cool before storage.
5. If you strike an object, stop and inspect the machine. Repair, if necessary, before restarting.
6. Never make adjustments or repairs with the engine running. Disconnect the spark plug wire(s) and ground against the engine to prevent unintended starting.
7. Check grass catcher components and the discharge guard frequently and replace with manufacturer's recommended parts, when necessary.
8. Mower blades are sharp. Wrap the blade or wear gloves, and use extra caution when servicing them.
9. Check brake operation frequently. Adjust and service as required.
10. Maintain or replace safety and instructions labels, as necessary.
11. Do not remove the fuel filter when the engine is hot as spilled gasoline may ignite. Do not spread fuel line clamps further than necessary. Ensure clamps grip hoses firmly over the filter after installation.
12. Do not use gasoline containing METHANOL, gasohol containing more than 10% ETHANOL, gasoline additives, or white gas because engine/fuel system damage could result.
13. If the fuel tank must be drained, it should be drained outdoors.
14. Replace faulty silencers/mufflers.
15. Maintain or replace safety and instruction labels as necessary.
16. Use only factory authorized replacement parts when making repairs.
17. Always comply with factory specifications on all settings and adjustments.
18. Only authorized service locations should be utilized for major service and repair requirements.
19. Never attempt to make major repairs on this unit unless you have been properly trained. Improper service procedures can result in hazardous operation, equipment damage and voiding of manufacturer's warranty.
20. On multiple blade mowers, take care as rotating one blade can cause other blades to rotate.
21. Do not change engine governor settings or over-speed the engine. Operating the engine at excessive speed can increase the hazard of personal injury.
22. Disengage drive attachments, stop the engine, remove the key, and disconnect the spark plug wire(s) before: clearing attachment blockages and chutes, performing service work, striking an object, or if the unit vibrates abnormally. After striking an object, inspect the machine for damage and make repairs before restarting and operating the equipment.
23. Never place hands near the moving parts, such as a hydro pump cooling fan, when the tractor is running. (Hydro pump cooling fans are typically located on top of the transaxle).
24. Units with hydraulic pumps, hoses, or motors: WARNING: Hydraulic fluid escaping under pressure may have sufficient force to penetrate skin and cause serious injury. If foreign fluid is injected into the skin it must be surgically removed within a few hours by a doctor familiar with this form of injury or gangrene may result. Keep body and hands away from pin holes or nozzles that eject hydraulic fluid under high pressure. Use paper or cardboard, and not hands, to search for leaks. Make sure all hydraulic fluid connections are tight and all hydraulic hoses and lines are in good condition before applying pressure to the system. If leaks occur, have the unit serviced immediately by your authorized dealer.
25. WARNING: Stored energy device. Improper release of springs can result in serious personal injury. Springs should be removed by an authorized technician.
26. Models equipped with an engine radiator: WARNING: Stored energy device. To prevent serious bodily injury from hot coolant or steam blow-out, never attempt to remove the radiator cap while the engine is running. Stop the engine and wait until it is cool. Even then, use extreme care when removing the cap.

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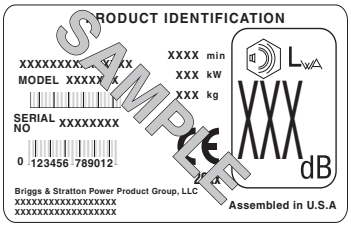
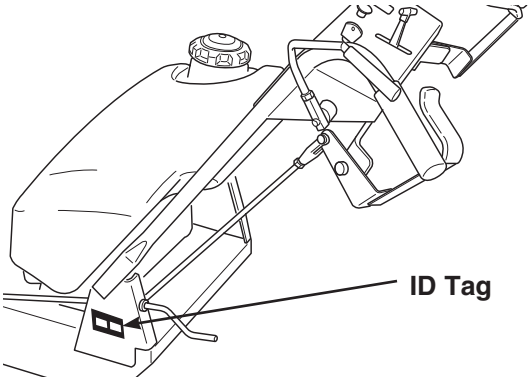
Identification Numbers





When contacting your authorized dealer for replacement parts, service, or information you MUST have these numbers.

Record your model name/number, manufacturer's identification numbers, and engine serial numbers in the space provided for easy access. These numbers can be found in the locations shown.

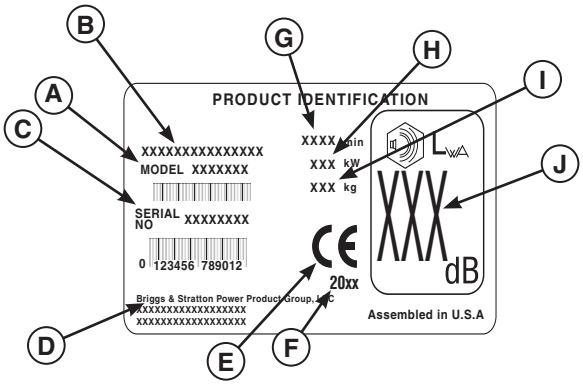
NOTE: For location of engine identification numbers, refer to the engine owner's manual.

CE Models: Place the extra copy of the identification tag in the manual.

PRODUCT REFERENCE DATA	
Model Description Name/Number	
Unit MFG Number	Unit SERIAL Number
Dealer Name	Date Purchased
ENGINE REFERENCE DATA	
Engine Make	Engine Model
Engine Type/Spec	Engine Code/Serial Number

CE IDENTIFICATION TAG MARKINGS

A. Manufacturer's Identification Number
B. Product Description
C. Serial Number
D. Manufacturer's Address
E. CE Compliance Logo
F. Year of Manufacture
G. Maximum Engine Speed in Rotations per Minute
H. Power Rating in Kilowatts
I. Mass of Unit in Kilograms
J. Sound Power in Decibels *



This unit complies with European Harmonized Lawn Mower Standard EN 836, European Machinery Directive 2006/42/EC, and European EMC Directive 2004/108/EC

* Tested according to 2000/14/EC

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SAFETY DECALS

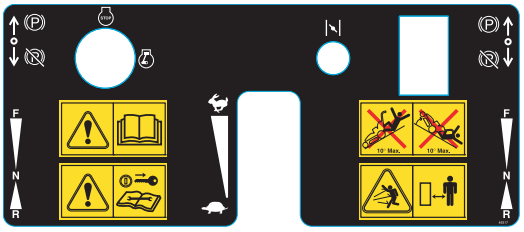
This unit has been designed and manufactured to provide you with the safety and reliability you would expect from an industry leader in outdoor power equipment manufacturing.

Although reading this manual and the safety instructions it contains will provide you with the necessary basic knowledge to operate this equipment safely and effectively, we have placed several safety labels on the unit to remind you of this important information while you are operating your unit.

All DANGER, WARNING, CAUTION and instructional messages on your unit should be carefully read and obeyed. Personal bodily injury can result when these instructions are not followed. The information is for your safety and it is important! The safety decals below are on your unit.

If any of these decals are lost or damaged, replace them at once. See your local dealer for replacements.

These labels are easily applied and will act as a constant visual reminder to you, and others who may use the equipment, to follow the safety instructions necessary for safe, effective operation.

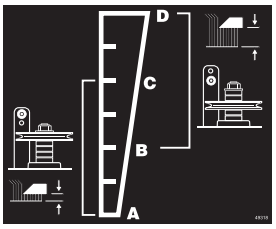


Decal - Main, Dashboard & Controls (Manual Start)
Part No. 5049317

Decal - Main, Dashboard & Controls (Electric Start)
Part No. 5100507

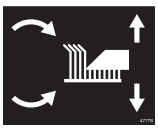
Decal - Transmission Release
Part No. 5049320

Decal - EU Battery (Electric Start)
Part No. 5102166
(This decal is located on the battery for CE models only.



Decal - Cutting Height / Pulley Spacer Adjustment
Part No. 5049318

Decal - Danger, Rotating Blades
Part No. 1720389



Decal - Cutting Height Adjustment
Part No. 5047778

Decal - Danger, Fire Hazard / Carbon Monoxide Poisoning
Part No. 5061217

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SAFETY ICONS

Warning: Read Operator's Manual.

Read and understand the Operator's Manual before using this machine.

Danger: Thrown Objects.

This machine is capable of throwing objects and debris. Keep bystanders away.

Warning: Remove Key Before Servicing.

Remove the key and consult technical literature before performing repairs or maintenance.

Danger: Carbon Monoxide Poisoning.

Do not operate the engine in an unventilated area.

Warning: Fire Hazard.

Keep children, open flames and sparks away from the battery, which could ignite explosive gases.

Warning: Batteries produce explosive gases.

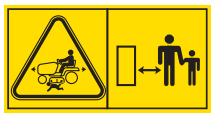
Read and understand the Operator's Manual before using this machine.

Danger: Machine Rollover.

Operating on steep slopes can cause sliding and loss of steering, control and rollover.

Danger: Dismemberment.

This machine can amputate limbs. Keep bystanders and children away when engine is running.



Danger: Dismemberment.

This mower deck can amputate limbs. Keep hands and feet away from blades.

Danger: Fire Hazard.

Keep unit free of grass, leaves and excess oil. Do not add fuel while engine is hot or running. Stop engine and allow to cool for 5 minutes prior to adding fuel. Do not add fuel indoors, in an enclosed trailer, garage or other enclosed areas. Clean up spilled fuel. Do not smoke while operating this machine.

Warning: Sulfuric acid can cause blindness or severe burns.

Always wear safety goggles or a face shield when working on or near a battery.

Important: Do not discard a battery in the trash.

Contact local authorities for disposal and/or recycling of batteries.

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FEATURES & CONTROLS

Please take a moment and familiarize yourself with the name, location, and function of these controls so that you will better understand the safety and operating instructions provided in this manual.

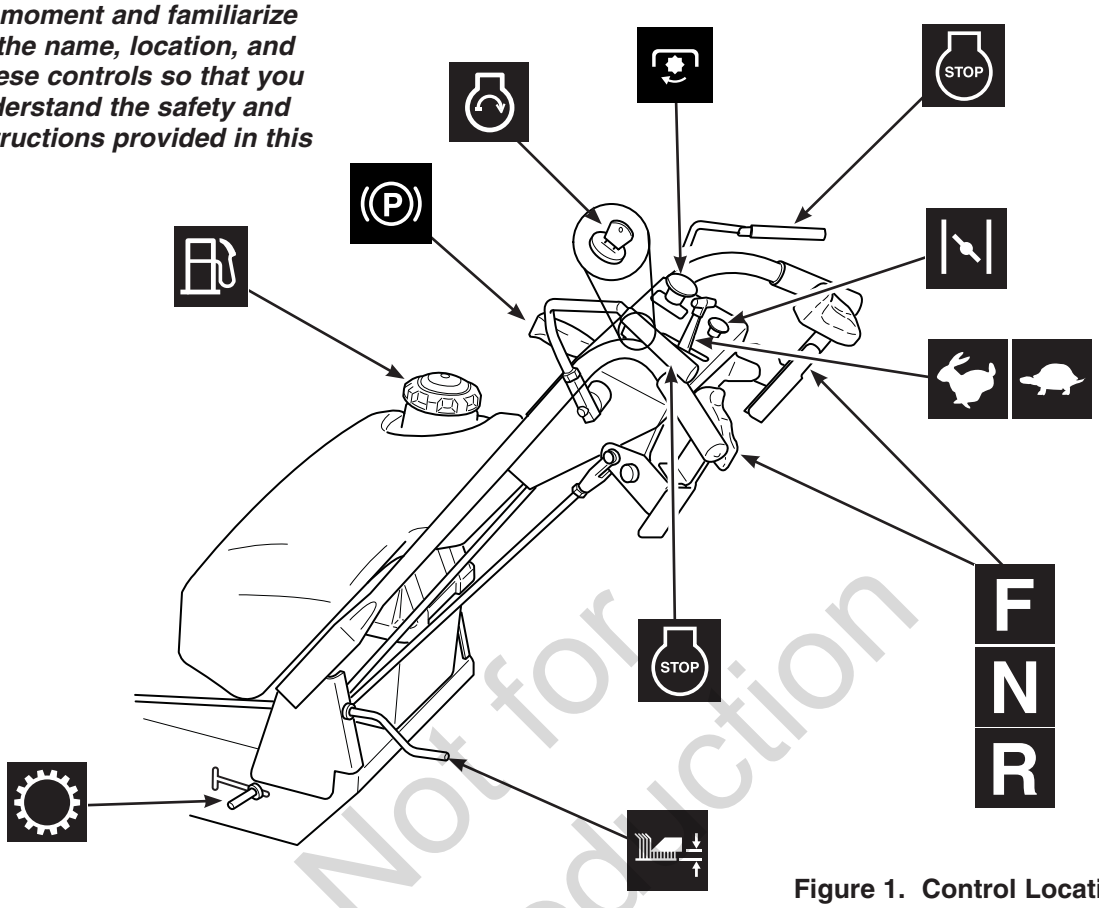

Figure 1. Control Locations

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CONTROL FUNCTIONS

The information below briefly describes the function of individual controls. Starting, stopping, driving, and mowing require the combined use of several controls applied in specific sequences. To learn what combination and sequence of controls to use for various tasks see the OPERATION section.

F N R Ground Speed Control Handles

These handles control the ground speed of the mower. The left and right handles are tied together so you can operate either lever to control the mower's ground speed.

Moving a handle forward to "F" increases the FORWARD speed of the mower. Moving a handle back to "R" increases the REVERSE speed. Moving the handles to to "N" neutral position stops mower travel.

Note: The further a handle is moved away from the neutral position the faster the mower will travel.

Throttle Control

Pulling the round choke control knob (D) out fully chokes the engine for cold starts. (A warm engine may not require choking.) Moving the throttle control (C) fully forward is FULL throttle position. Always operate the unit at FULL throttle when mowing.

Ignition Switch

The ignition switch starts and stops the engine, it has three positions:

O	OFF	Stops the engine and shuts off the electrical system.
I	RUN	Allows the engine to run and powers the electrical system.
	START	Cranks the engine for starting.

NOTE: Never leave the ignition switch in the RUN position with the engine stopped–this drains the battery.

Choke

Close the choke for cold starting. Open the choke once the engine starts. A warm engine may not require choking. Pull the knob UP to close the choke. Push to knob DOWN to open the choke.

PTO (Power Take Off) Switch

The PTO Switch engages and disengages the mower blades.

To engage the mower blades, pull up on the switch. To disengage the mower blades, push down on the switch.

When the PTO engagement lever or switch is in the Engaged position, the Engine Kill system is activated.

Parking Brake

DISENGAGE Releases the parking brake.

ENGAGE Locks the parking brake.

Pull the parking brake lever back to engage the parking brake. Move the lever fully forward to disengage the parking brake. *NOTE: To start the unit the parking brake must be engaged.*

Cutting Height Adjust Handle

The cutting height adjust handle controls the mower cutting height. To adjust the mower cutting height, turn the crank handle clockwise to raise the cutting height. Turn the crank handle counterclockwise to lower the cutting height. Observe the cutting height indicator on the left side of the mower deck.

Transmission Release Valve

The transmission release valve deactivates the transmissions so that the unit can be pushed by hand.

Engages the transmission; the mower will move under its own power.

Disengages the transmission; the mower can now be pushed by hand.

See PUSHING THE MOWER BY HAND for operational information.

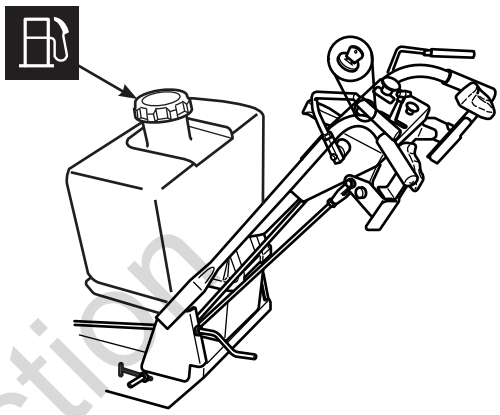
Engine Kill / Operator Presence Handles

These handles are a major factor in the safety interlock system of the mower. Both handles are tied together so depressing one handle depresses both. The operator must depress the handles in order to deactivate the engine kill system. Handles must be depressed to disengage the parking brake and engage the PTO switch.

Fuel Tank Cap

To remove cap, turn counterclockwise.

16 HP Models



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SAFETY INTERLOCK SYSTEM

This unit is equipped with safety interlock switches and other safety devices. These safety systems are present for your safety, do not attempt to bypass safety switches, and never tamper with safety devices. Check their operation regularly.

Operational SAFETY Checks

Your unit is equipped with an operator presence switch safety system. Check the operator presence switch operation every fall and spring with the following tests.

Test 1 — Engine WILL NOT start if:

- PTO switch is engaged.
- Parking brake is disengaged.

Test 2 — Engine WILL start if:

- PTO switch is NOT engaged.
- Parking brake is engaged.

Test 3 — Engine should SHUT OFF if:

- Operator releases the engine kill / operator presence handles with the PTO engaged.
- Operator releases the engine kill / operator presence handles with the parking brake disengaged.

Test 4 — Blade Brake Check

Mower blades and mower drive belt should come to a complete stop within seven (7) seconds after electric PTO switch is turned off (or operator releases operator presence handles). If mower drive belt does not stop within seven (7) seconds, see your dealer.

NOTE: Once the engine has stopped, PTO switch must be turned off in order to start the engine.

WARNING

If the unit does not pass a safety test, do not operate it. See your authorized dealer. Under no circumstance should you attempt to defeat the purpose of the safety interlock system.

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Operation

GENERAL OPERATING SAFETY

Before first time operation:

- Be sure to read all information in the Safety and Operation sections before attempting to operate this tractor and mower.
- Become familiar with all of the controls and how to stop the unit.
- Drive in an open area without mowing to become accustomed to the unit.

CHECKS BEFORE STARTING

- Check that crankcase is filled to full mark on dipstick. See the engine Operator's Manual for instructions and oil recommendations.
- Make sure all nuts, bolts, screws and pins are in place and tight.
- Fill the fuel tank with fresh fuel. Refer to engine manual for fuel recommendations.
- Make sure fuel shut off valve is in the ON position.

⚠ WARNING

Before leaving the operator's position for any reason, disengage the PTO, stop the engine and remove the key.

To reduce fire hazard, keep the engine, tractor and mower free of grass, leaves and excess grease. Do not stop or park tractor over dry leaves, grass or combustible materials.

Gasoline is highly flammable and must be handled with care. Never fill the tank when the engine is still hot from recent operation. Do not allow open flame, smoking or matches in the area. Avoid over-filling and wipe up any spills.

⚠ WARNING

Operating on steep slopes can cause sliding and loss of steering, control and rollover.

Select slow ground speed before driving onto a slope. Use extra caution when operating on slopes.

Mow up and down the face of slopes, not across, use caution when changing directions and DO NOT START OR STOP ON SLOPE.

⚠ WARNING

If you do not understand how a specific control functions, or have not yet thoroughly read the FEATURES & CONTROLS section, do so now.

Do NOT attempt to operate the tractor without first becoming familiar with the location and function of ALL controls.

STARTING THE ENGINE

- Make sure the PTO switch is disengaged and the parking brake is engaged.
- Set the engine throttle control to FAST throttle position. Then fully close the choke by pulling the knob OUT fully.

NOTE: A warm engine may not require choking.

Manual Start:

- Insert the key into the ignition switch and turn it to RUN.
- Grasp recoil handle and pull cord briskly. (You may have to pull several times before engine starts. If engine fails to start within a reasonable number of attempts, discontinue and check engine manual for further instructions.)

NOTE: Be sure recoil cord retracts fully into recoil unit. A slack recoil cord can cause serious personal injury and/or damage to unit.

- After the engine starts, gradually open the choke (push knob down fully). Reduce to half throttle speed and allow to warm up.

Electric Start:

- Insert the key into the ignition switch and turn it to START.
- After the engine starts, gradually open the choke (push knob down fully). Reduce to half throttle speed and allow to warm up

Warm up the engine by running it for at least a minute before engaging the PTO lever/switch or driving the mower.

After warming the engine, ALWAYS operate the unit at FULL THROTTLE when mowing.

In the event of an emergency the engine can be stopped by simply turning the ignition switch to STOP. *Use this method only in emergency situations. For normal engine shut down follow the procedure given*

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DRIVING THE MOWER

- Make sure the PTO switch is disengaged.
- Start the engine (see STARTING THE ENGINE).
- Set the throttle control to FULL.
- ***Manual Start:***
  Grasp the operator presence / parking brake handles and the handle bar grips at the same time to deactivate engine kill system and disengage the parking brake.
- ***Electric Start:***

  Push down on both of the engine kill / operator presence handles to deactivate the engine kill system. Push the brake lever forward the disengage the parking brake.
- With your thumbs, pressing the ground speed control levers forward will move the mower forward. Pulling them back will move the mower backwards. The farther the levers are pushed or pulled will result in a faster ground speed.
- To slow the mower, gently release your thumb pressure on the ground speed control levers to return them to the neutral position.

OPERATING ON A SLOPE

While it is not recommended, traveling up and down slopes may be required from time to time. These guide lines are listed for your safety.

Traveling Up a Slope

Since the hill climbing ability of the machine will probably far exceed any other machine you may have operated, caution should be observed.

- Never make abrupt speed or direction changes on a slope.
- Never push down on the handle bars while going up a grade. A slight lifting pressure is recommended to keep the front wheels on the ground.

Traveling Down a Slope

A very slow ground speed should always be used when traveling down a slope. This can be accomplished by GENTLY moving the ground speed control levers towards the reverse direction.

STOPPING THE MOWER

- Returning the ground speed control levers to the neutral position will stop movement.
- Disengage the PTO.
- ***Manual Start*** Release the operator presence / parking brake handles to engage the parking brake.
- ***Electric Start:*** Engage the parking brake.
- Move the throttle control to mid-throttle position and turn the ignition key to OFF. Remove the key.

MOWING

- Make sure the PTO switch is disengaged.
- Start the engine (see STARTING THE ENGINE).
- Set the throttle control to FULL.
- ***Manual Start:***

  Grasp the operator presence / parking brake handles and the handle bar grips at the same time to deactivate engine kill system and disengage the parking brake.
- ***Electric Start:***

  Push down on both of the engine kill / operator presence handles to deactivate the engine kill system. Push the brake lever forward the disengage the parking brake.
- Engage the PTO by pulling up on the PTO switch.
- Begin mowing. See Lawn Care Section in the back of this manual for tips on mowing patterns, lawn care, and trouble shooting information.
- When finished, disengage the PTO.
- Stop the engine (see STOPPING THE MOWER).

PUSHING THE MOWER BY HAND

DO NOT TOW MOWER
Towing the unit will cause hydraulic transmission damage. Do not use another vehicle to push or pull this unit.

- Disengage the PTO, turn the ignition OFF, and remove the key.
- Slide the hydraulic release rod forward and lock into the top of the “T” slot. See Figure 2.
- ***Manual Start:*** Grasp the operator presence / parking brake handles and the handle bar grips at the same time to disengage the parking brake.
- ***Electric Start::*** Disengage the parking brake.

  The mower can now be pushed by hand.
- After moving the mower, re-engage the transmission (DRIVE position) by releasing the rod from the “T” and sliding the release handle towards the rear of the machine.

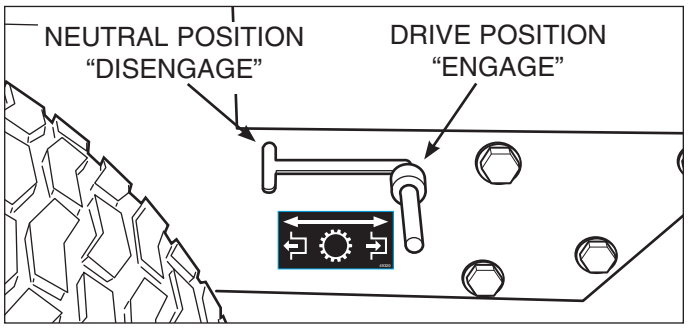

Figure 2. Hydraulic Release Rod

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STORAGE

Temporary Storage (30 Days Or Less)

Remember, the fuel tank will still contain some gasoline, so never store the unit indoors or in any other area where fuel vapor could travel to any ignition source. Fuel vapor is also toxic if inhaled, so never store the unit in any structure used for human or animal habitation.

Here is a checklist of things to do when storing your unit temporarily or in between uses:

- Keep the unit in an area away from where children may come into contact with it. If there's any chance of unauthorized use, remove the spark plug (s) and put in a safe place. Be sure the spark plug opening is protected from foreign objects with a suitable cover.
- If the unit can't be stored on a reasonable level surface, chock the wheels.
- Clean all grass and dirt from the mower.

Long Term Storage (Longer Than 30 Days)

Before you store your unit for the off-season, read the Maintenance and Storage instructions in the Safety Rules section, then perform the following steps:

- Drain crankcase oil while engine is hot and refill with a grade of oil that will be required when unit is used again.
- Prepare the mower deck for storage as follows:
  a. Clean underside of mower deck.
  b. Coat all bare metal surfaces with paint or light coat of oil to prevent rusting.
- Clean external surfaces and engine.
- Prepare engine for storage. See engine owner's manual.
- Clean any dirt or grass from cylinder head cooling fins, engine housing and air cleaner element.
- Cover air cleaner and exhaust outlet tightly with plastic or other waterproof material to keep out moisture, dirt and insects.
- Completely grease and oil unit as outlined in the Normal Care section.
- Clean up unit and apply paint or rust preventative to any areas where paint is chipped or damaged.

⚠ WARNING

Never store the unit, with gasoline in engine or fuel tank, in a heated shelter or in enclosed, poorly ventilated enclosures. Gasoline fumes may reach an open flame, spark or pilot light (such as a furnace, water heater, clothes dryer, etc.) and cause an explosion.

Handle gasoline carefully. It is highly flammable and careless use could result in serious fire damage to your person or property.

Drain fuel into an approved container outdoors away from open flame or sparks.

- Drain fuel system completely or add a gasoline stabilizer to the fuel system. If you have chosen to use a fuel stabilizer and have not drained the fuel system, follow all safety instructions and storage precautions in this manual to prevent the possibility of fire from the ignition of gasoline fumes. Remember, gasoline fumes can travel to distant sources of ignition and ignite, causing risk of explosion and fire.

NOTE: Gasoline, if permitted to stand unused for extended periods (30 days or more), may develop gummy deposits which can adversely affect the engine carburetor and cause engine malfunction. To avoid this condition, add a gasoline stabilizer to the fuel tank and run the engine a few minutes, or drain all fuel from the unit before placing it in storage.

STARTING AFTER LONG TERM STORAGE

Before starting the unit after it has been stored for a long period of time, perform the following steps.

- Remove any blocks from under the unit.
- Unplug the exhaust outlet and air cleaner.
- Fill the fuel tank with fresh gasoline. See engine manual for recommendations.
- See engine owner's manual and follow all instructions for preparing engine after storage.
- Check crankcase oil level and add proper oil if necessary. If any condensation has developed during storage, drain crankcase oil and refill.
- Inflate tires to proper pressure. Check fluid levels.
- Start the engine and let it run slowly. DO NOT run at high speed immediately after starting. Be sure to run engine only outdoors or in well ventilated area.

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MAINTENANCE SCHEDULE & PROCEDURES

The following schedule should be followed for normal care of your unit. You will need to keep a record of your operating time. Determining operating time is easily accomplished by multiplying the time it takes to do one job by the number of times you've done the job, or you can install an hour meter.

SAFETY ITEMS	Before Each Use	Every 5 Hours	Every 25 Hours	Every 100 Hours	Every 250 Hours	Spring & Fall
Check Safety Interlock System	•					•
Check Mower Blade Stopping Time				•		•
UNIT MAINTENANCE ITEMS	**Before Each Use**	**Every 5 Hours**	**Every 25 Hours**	**Every 100 Hours**	**Every 250 Hours**	**Spring & Fall**
Check for loose hardware		•				
Check / Clean Engine Cooling Fins			•			
Check / Adjust PTO Clutch			***	•		
Lubricate **			•			
Check Tire Pressure			•			
Clean Deck & Check/Replace Mower Blades**			•			
ENGINE MAINTENANCE ITEMS	**Before Each Use**	**Every 5 Hours**	**Every 25 Hours**	**Every 100 Hours**	**Every 250 Hours**	**Spring & Fall**
Check Engine Oil Level	•					
Check / Change Engine Air Filter *						
Change Engine Oil & Filter *						
Inspect Spark Plug(s) *						
Check / Replace Fuel Filter *						

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* Refer to engine owner's manual. Change original engine oil after initial break-in period.
** More often in hot (over 85° F: 30° C) weather or dusty operating conditions.
*** Service after the first 25 hours of operation, then every 100 hours of operation.

CHECK TIRE PRESSURE

Tire Pressure should be checked periodically, and maintained at the levels shown in the chart. Note that these pressures may differ slightly from the "Max Inflation" stamped on the side-wall of the tires. The pressures shown provide proper traction, improve cut quality, and extend tire life.

Tire	Pressure
Front	25 psi (1,72 bar)
Rear	15 psi (1,03 bar)

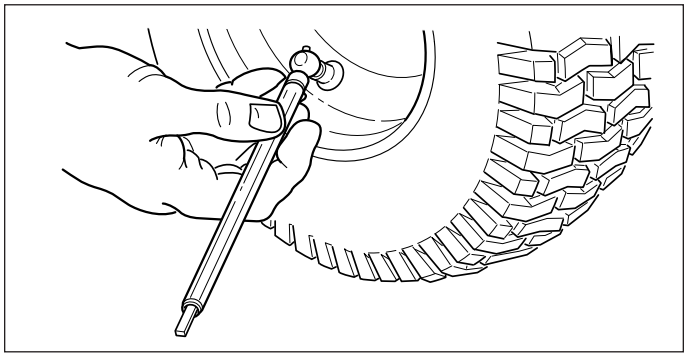

Figure 3. Checking Tire Pressure

CHECKING / ADDING FUEL

To add fuel:

- Remove the fuel cap.
- Fill the tank.
- Do not overfill. Leave approximately 1" of room in the tank for fuel expansion. Refer to your engine manual for specific fuel recommendations.
- Install and hand tighten the fuel cap.

FUEL FILTER

The fuel filter is located in the fuel line between the fuel shut off valve and the fuel pump. If filter is dirty or clogged, replace as follows:

- Shut off the fuel valve.
- Place a container below the filter to catch spilled fuel.
- Using a pliers, open and slide hose clamps from fuel filter.
- Remove hoses from filter.
- Install new filter in proper flow direction in fuel line.
- Secure with hose clamps.

OIL & FILTER CHANGE

1. Warm engine by running for a few minutes. (Refer to the engine operator's manual for oil & filter replacement instructions.)
2. Park machine and place the rear tires in a 2 x 4 block of wood or park machine on a slight downhill grade (see Figure 4).
3. Place a small pan under the oil drain hose to catch the oil.
4. Using the appropriate tools, remove the cap from the oil drain hose and drain the engine oil.
5. After draining, replace the cap and wipe up any spilled oil.
6. Place a small pan or cup under the engine oil filter.
7. Remove the engine oil filter and replace with a new one.
8. Remove the pan or cup and wipe up any spilled oil.

CHECK / CHANGE AIR FILTER

Refer to engine owner's manual.

REPLACE SPARK PLUG

Refer to engine owner's manual.

TRANSMISSION MAINTENANCE

The transmission is a sealed unit and does not require regular maintenance.

⚠ WARNING

Gasoline is highly flammable and must be handled with care. Never fill the tank when the engine is still hot from recent operation. Do not allow open flame, smoking or matches in the area. Avoid over-filling and wipe up any spills.

Do not remove fuel filter when engine is hot, as spilled gasoline may ignite. DO NOT spread hose clamps further than necessary. Ensure clamps grip hoses firmly over filter after installation.

Do not use gasoline containing METHANOL, gasohol containing more than 10% ethanol, gasoline additives, premium gasoline, or white gas because engine/fuel system damage could result.

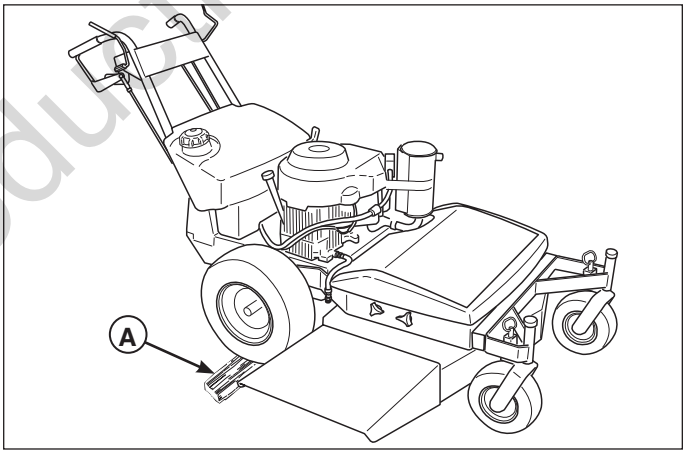

Figure 4. Raise Rear of Machine
A. 2 x 4 Block

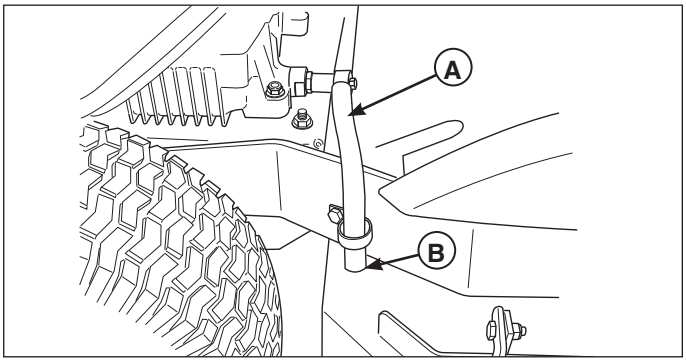

Figure 5. Oil Drain Hose Location
A. Oil Drain Hose
B. Cap

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LUBRICATION

Lubricate the unit at the following lubrication points.

Grease:

- front caster wheel axles
- front caster wheel pivots
- ground speed control shaft pivot

Use grease fittings when present. Disassemble parts to apply grease to moving parts when grease fittings are not installed.

Not all greases are compatible. Automotive-type lithium grease is recommended.

Oil:

- operator presence / parking brake handle pivot
- ground speed control lever pivots
- discharge chute pivots
- cutting height adjust handle pivots
- deck lift pivots

Generally, all moving metal parts should be oiled where contact is made with other parts. Keep oil and grease off belts and pulleys. Remember to wipe fittings and surfaces clean both before and after lubrication.

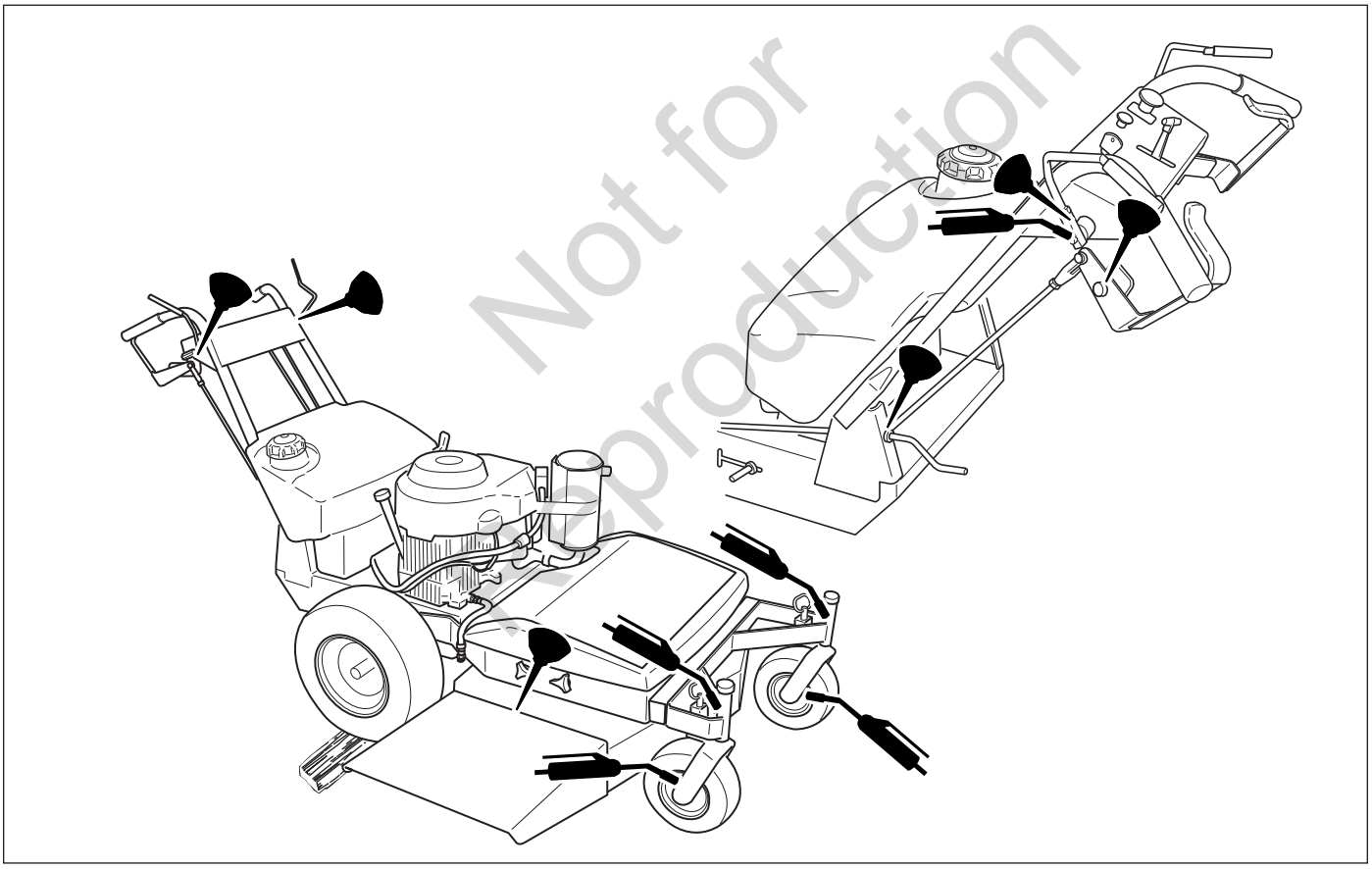

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Figure 6. Lubrication Points

SERVICING THE MOWER BLADES

- Blades should be sharp and free of nicks and dents. If not, sharpen blades as described in following steps.
- To remove blade for sharpening, use a 1" wrench on the flats of the spindle shaft while removing the blade mounting bolt with a 15/16" wrench (Figure 7).
- Use a file to sharpen blade to fine edge. Remove all nicks and dents in blade edge. If blade is severely damaged, it should be replaced.
- Balance the blade as shown in Figure 8. Center the blade's hole on a nail lubricated with a drop of oil. A balanced blade will remain level.
- Reinstall each blade with the tabs pointing up toward deck as shown in Figure 9. Secure with a bolt and flat washer and torque bolts to 70 ft.lbs. (94 Nm).

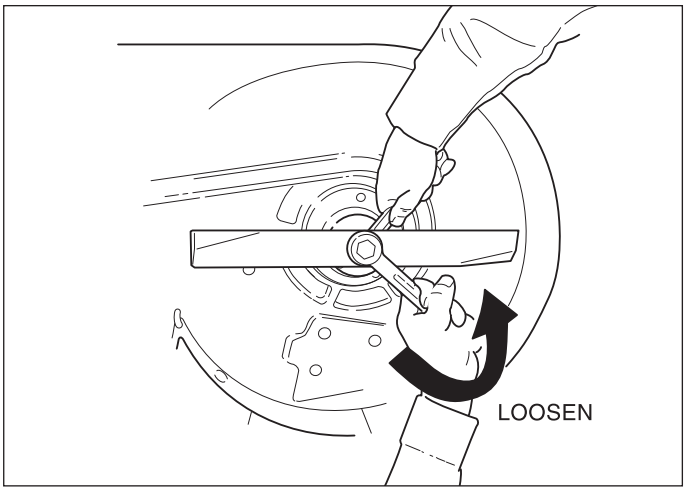

Figure 7. Removing the Blade

⚠ WARNING

Mower blades are sharp. For your personal safety, do not handle mower blades with bare hands. Careless or improper handling of blades may result in serious injury. For your personal safety, blade mounting bolts must each be installed with a flat washer then securely tightened. Torque blade mounting bolts to 70 ft.lbs. (94 Nm)

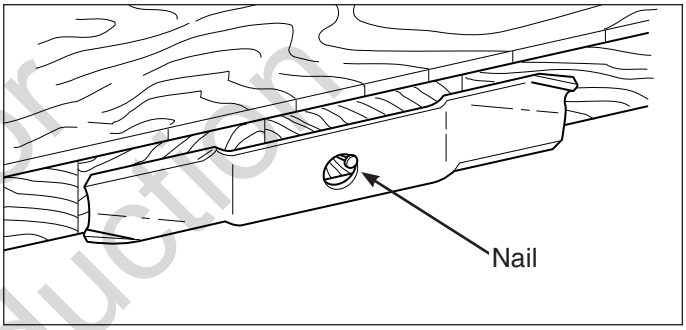

Figure 8. Balancing The Blade

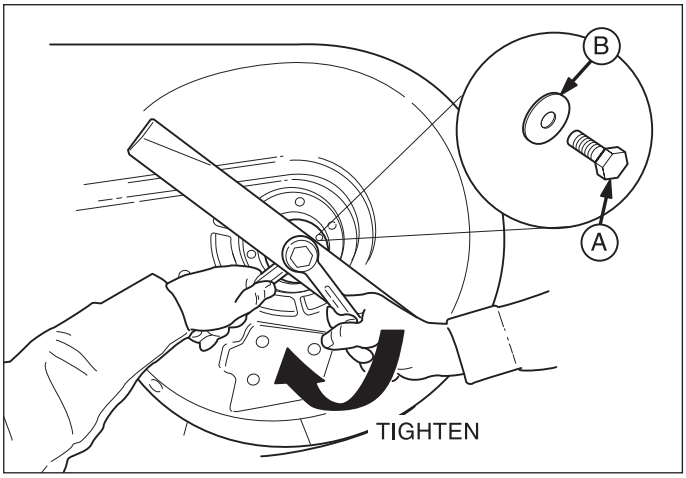

Figure 9. Installing The Blade
A. Bolt
B. Flat Washer

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Troubleshooting, Adjustments, & Repair

TROUBLESHOOTING

While normal care and regular maintenance will extend the life of your equipment, prolonged or constant use may eventually require that service be performed to allow it to continue operating properly.

The troubleshooting guide below lists the most common problems, their causes and remedies.

See the information on the following pages for instructions on how to perform most of these minor adjustments and service repairs yourself. If you prefer, all of these procedures can be performed for you by your local authorized dealer.

⚠ WARNING

To avoid serious injury, perform maintenance on the tractor or mower only when the engine is stopped and the parking brake engaged.

Always remove the ignition key, disconnect the spark plug wire and fasten it away from the plug before beginning the maintenance, to prevent accidental starting of the engine.

TROUBLESHOOTING THE MOWER

PROBLEM	CAUSE	REMEDY
Engine will not turnover or start.	1. PTO (electric clutch) switch in ON position.	1. Place in OFF position.
2.	Out of fuel. the fuel tank.	2. If engine is hot, allow it to cool, then refill
3.	Engine flooded.	3. Move throttle control out of CHOKE position.
4.	Wiring loose or broken. frayed wires. Tighten loose connections.	4. Visually check wiring & replace broken or
5.	Safety interlock switch faulty.	5. Replace as needed. See authorized service dealer.
6.	Spark plug(s) faulty, fouled or incorrectly gapped.	6. Clean and gap or replace. See engine manual.
7.	Water in fuel.	7. Drain fuel & refill with fresh fuel.
8.	Gas is old or stale.	8. Drain fuel & replace with fresh fuel.
Engine starts hard or runs poorly.	1. Fuel mixture too rich. (throttle control).	1. Clean air filter. Check choke adjustment
2.	Spark plug faulty, fouled, or incorrectly gapped.	2. Clean and gap or replace. (See engine manual.)
Engine knocks.	1. Low oil level.	1. Check/add oil as required.
2.	Using wrong grade oil.	2. See engine manual.
Excessive oil consumption.	1. Engine running too hot. air cleaner.	1. Clean engine fins, blower screen and
2.	Using wrong weight oil.	2. See engine manual.
3.	Too much oil in crankcase.	3. Drain excess oil.
Engine exhaust is black.	1. Dirty air filter.	1. Replace air filter. See engine manual.
2.	Engine choke control is in closed position.	2. Open choke control.
Engine runs, but mower will not drive.	1. Hydraulic release valve rod in “open” position.	1. Return release rod to DRIVE position.
2.	Belt is broken.	2. See Drive Belt Replacement.
3.	Drive belt slips.	3. See problem and cause below.
4.	Brake is not fully released.	4. See authorized service dealer
Brake will not hold.	1. Brake is incorrectly adjusted.	1. See authorized service dealer.
Mower drives or handles poorly.	1. Loose control linkages.	1. Check and tighten any loose connections.
2.	Improper tire inflation.	2. See Regular Maintenance Section.

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TROUBLESHOOTING THE MOWER DECK

PROBLEM	CAUSE	REMEDY
Mower drive belt slips or fails to drive.	1. Clutch is out of adjustment.	1. See PTO CLutch Adjustment Section.
	2. Pulleys or belt greasy or oily.	2. Clean as required.
3.	Idler pulley spring broken or not properly attached.	3. Repair or replace as needed.
4.	Belt stretched or worn.	4. Replace drive belt.
5.	Mower drive belt broken.	5. Replace drive belt.
Mower cut is uneven.	1. Mower not leveled properly.	1. See Mower Adjustment.
2.	Drive tires not inflated equally or properly.	2. See Regular Maintenance Section.
Mower cut is rough looking.	1. Engine speed too slow.	1. Set throttle to full.
2.	Ground speed too fast.	2. Decrease ground speed.
3.	Blades are dull. See Mower Blade Service.	3. Sharpen or replace blades.
4.	Mower drive belt slipping because it is oily or worn.	4. Clean or replace belt as necessary.
5.	Blades not properly fastened to arbors.	5. See Servicing the Mower Blades.
Engine stalls easily with mower engaged.	1. Engine speed too slow.	1. Set to full throttle.
	2. Ground speed too fast.	2. Decrease ground speed.
3.	Cutting height set too low.	3. Cut tall grass at maximum cutting height during first pass.
4.	Discharge chute plugged with cut grass.	4. Cut grass with discharge pointing toward previously cut area.
Excessive mower vibration.	1. Blade mounting screws are loose.	1. Tighten to 70 ft.lbs. (94 N.m.).
2.	Mower blades, arbors, or pulleys are bent.	2. Check and replace as necessary.
3.	Mower blades are out of balance.	3. Remove, sharpen, and balance blades. See Maintenance Section.
4.	Belt installed incorrectly.	4. Reinstall correctly.
Excessive belt wear or breakage.	1. Bent or rough pulleys.	1. Repair or replace.
2.	Using incorrect belt.	2. Replace with correct belt.

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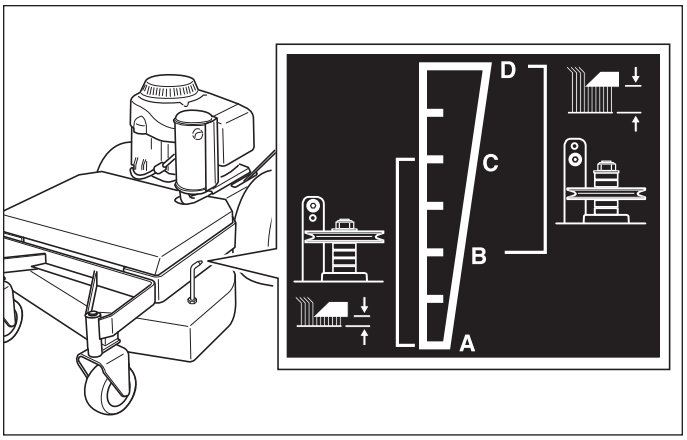

Figure 10. Deck Height Indicator

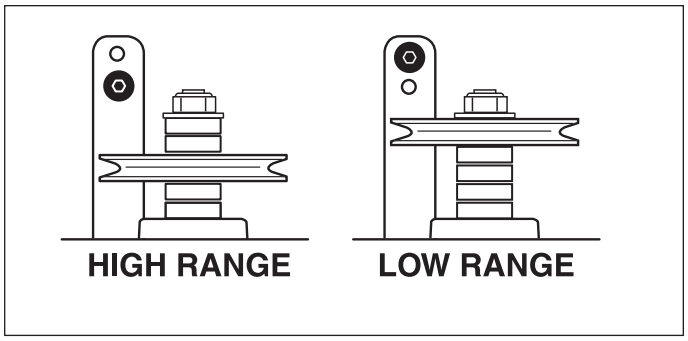

Figure 11. Pulley & Pivot Position

CUTTING HEIGHT ADJUSTMENT

The cutting height can be adjusted within two different ranges. The High Range covers 4-1/2" - 2-1/2" (11,4 - 6,4cm) and the Low Range covers 3-1/2" - 1-1/2" (8,9 - 3,8cm). See Figure 10 for deck height indicator.

Before adjusting the cutting height, you must first determine the average cutting height. Depending on the range you plan to use, it may be necessary to adjust the deck lift pivot locations and the pulley spacer positions. See Figures 11 & 12 for pulley and pivot positions in relation to the cutting range.

To Adjust the Cutting Range:

1. Remove the mower deck drive belt. See Belt Removal & Replacement Section for proper procedure.
2. Remove the spindle nut (B, Figure 12) fastening the pulley to the spindle. Remove the pulley and key. Move the pulley spacers into the proper position in relation to the cutting range. Reinstall the pulley and key. Reinstall the nut and torque to 85-90 ft. lbs. (115-122 Nm).
3. Remove the pivot bolts and nuts (A, Figure 12) and reinstall the proper position in relation to the cutting range. Reinstall the bolts and nuts a tighten securely.

To Adjust the Cutting Height:

Turn the crank handle clockwise to raise the mower deck or counterclockwise to lower the mower deck. See Figure 13.

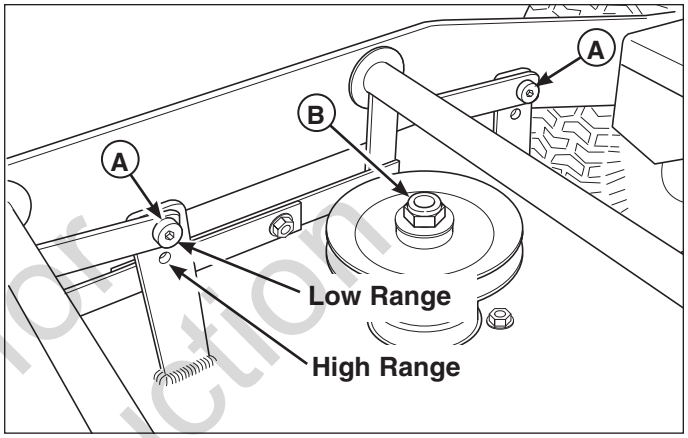

Figure 12. Pulley & Pivot Position
A. Pivot Bolts & Nuts
B. Spindle Nut

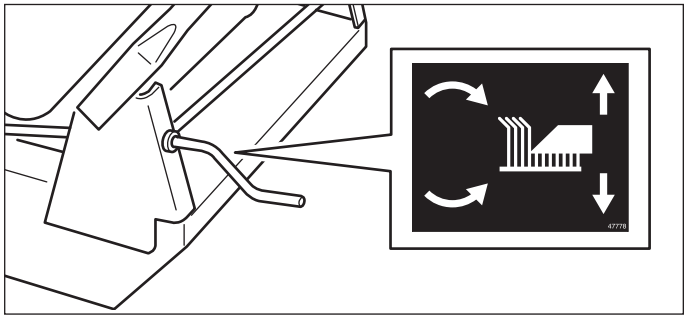

Figure 13. Cutting Height Adjustment

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DECK LEVELING ADJUSTMENT

To Level the Mower Deck:

1. Park machine on a flat, level surface.
2. Raise the mower deck until it reaches the upper stop.
3. If the mower deck is in the HIGH RANGE, place 2 x 4 blocks under the outside edges of the mower deck with the 3-1/2" sides being vertical. Place a 1/8" (3mm) thick spacer on top of the rear 2 x 4 blocks. (See Figure 14)

   If the mower deck is in the LOW RANGE, place 2 x 4 blocks under the outside edges of the mower deck with the 1-1/2" sides being vertical. Place a 1/8" (3mm) thick spacer on top of the rear 2 x 4 blocks. (See Figure 14)
4. Lower the mower deck until the deck rests against the 2 x 4 blocks and spacers.
5. Loosen the bolts (A, Figure 15) that secure the connecting links (B) together. This will remove any tension from the mounting linkages and pivots.
6. Retighten the bolts securely.
7. Verify that the deck height indicator (C) is aligned with the 4" mark (if in the HIGH RANGE) or the 2" mark (if in the LOW RANGE). Adjust the indicator position if necessary.
8. Remove the blocks from under the mower deck.

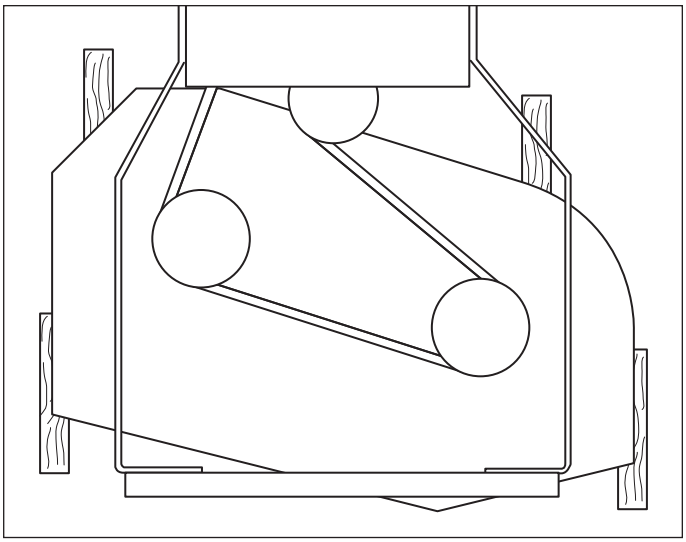

Figure 14. 2 x 4 Block Placement

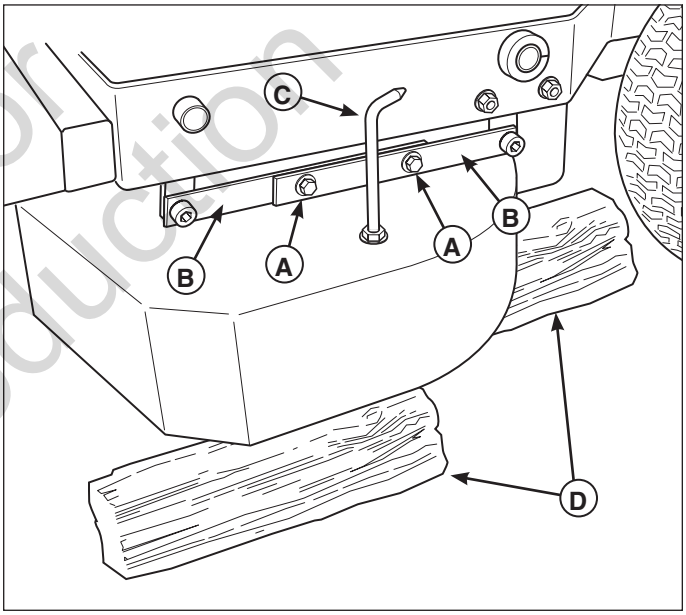

Figure 15. Deck Leveling Linkages
A. Linkage Bolts
B. Connecting Links
C. Deck Height Indicator
D. 2 x 4 Blocks

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BELT REMOVAL AND REPLACEMENT

Mower Deck Drive Belt: (32" model)

1. Park machine on a flat, level surface.
2. Remove the mower deck shield.
3. Push the idler arm towards the left-hand side of the machine to release the spring tension on the drive belt. (See Figure 16)
4. Slide the drive belt over the edge of the idler pulley (A). Release the idler arm.
5. Remove the old belt and replace with a new one. Make sure the V-side of the belt runs in the pulley grooves.
6. Install the drive belt on the spindle pulleys and the PTO clutch pulley. Again, push the idler arm towards the left-hand side of the machine and install the belt onto the idler pulley (A).
7. Run the mower under no-load condition for about 5 minutes to break in the belt.

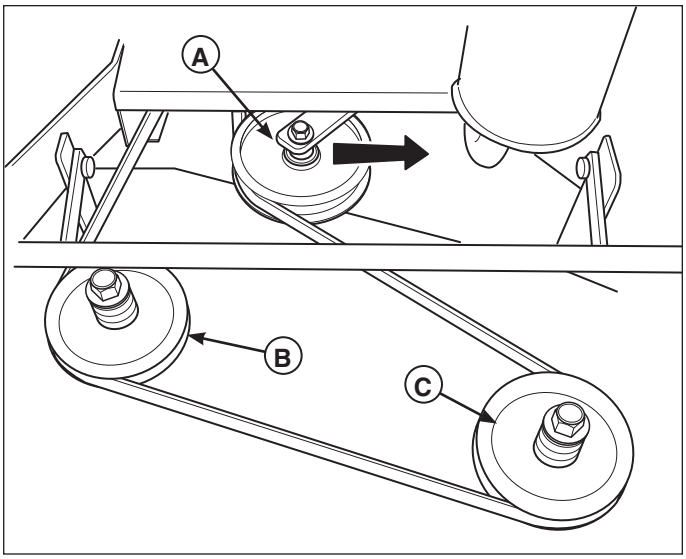

Figure 16. Mower Deck Drive Belt
A. Idler Pulley
B. Right-Hand Spindle Pulley
C. Left-Hand Spindle Pulley

Transaxle Drive Belt:

1. Park machine on a flat, level surface.
2. Remove the rear shield.
3. Remove the mower deck drive belt from the PTO clutch. See instructions above.
4. With a steel coat hanger, form a small hook. Insert the coat hanger through the opening in the right-hand side of the engine deck. Use the coat hanger to remove the spring (A, Figure 17) from the anchor pin (C).
5. Remove the belt from the idler pulley. Then remove the belt from the transaxle drive pulley and pull towards front of machine. Remove the belt from the drive pulley on the engine and drop belt around the PTO clutch to completely remove from machine.
6. Replace the old belt with a new belt. Install the new belt around the PTO clutch and onto the drive pulley on the engine. Reinstall belt onto the transaxle drive pulley and then onto the idler pulley. Make sure the V-side of the belt runs in the pulley grooves.
7. Using the coat hanger, reinstall the spring onto the anchor pin.
8. Reinstall the rear shield.

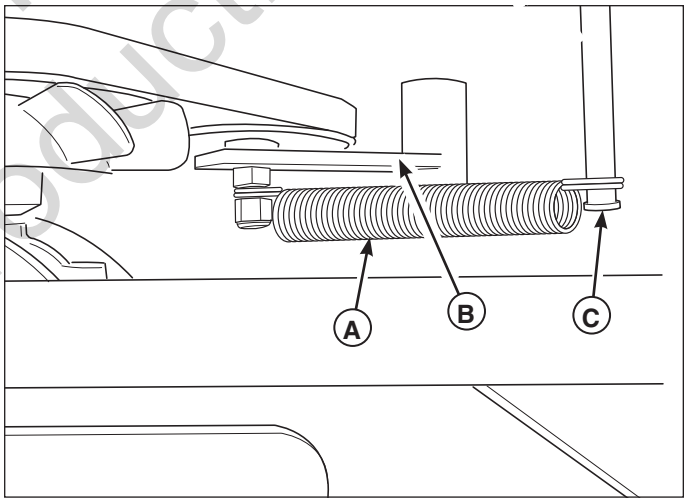

Figure 17. Transaxle Drive Belt
B. Spring
C. Drive Idler Arm
C. Anchor Pin

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GROUND SPEED CONTROL LEVER LOCATION ADJUSTMENT

The control levers can be adjusted in two ways to provide a comfortable working range when operating the machine at the average mowing speed.

Adjust both the lever height and lever position at the same time to obtain the most comfortable working position

Adjusting the Lever Height:

1. Loosen the lever fastener (B, Figure 18) to adjust the lever height. Make sure the levers are parallel with the handle bars in both forward and reverse without contacting the handle bars.

Adjusting the Lever Position:

1. Remove the hairpin and clevis pin (D) that fasten the control rod (E) to the lever pivot (C).
2. Loosen the jam nut and adjust the position of the clevis on the rod. By shortening the rod (turning the clevis clockwise), it will move the lever forward. By lengthening the rod (turning the clevis counter-clockwise), it will move the lever rearward. Adjust until the desired lever position is obtained and tighten the jam nuts.
3. Reinstall the clevis on the lever pivot and secure with the clevis pin and hairpin.

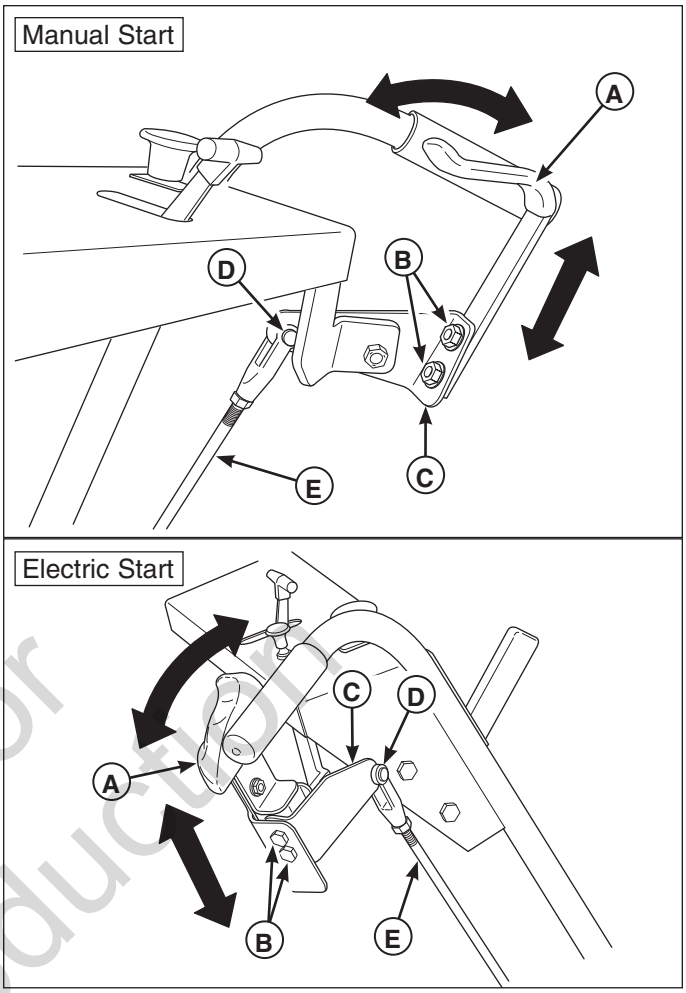

Figure 18. Ground Speed Control Lever Adjustment
A. Control Lever
B. Lever Fastener
C. Lever Pivot
D. Clevis Pin & Hairpin
E. Control Rod

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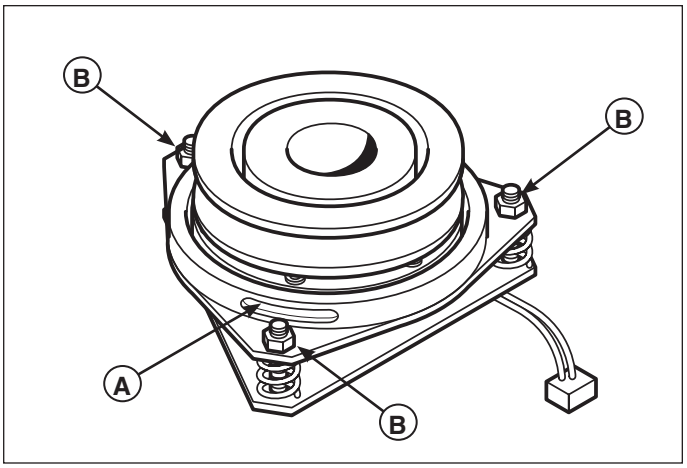

Figure 19. PTO Clutch Adjustment
A. Adjustment Window (Qty. 3, one shown)
B. Adjustment Nut

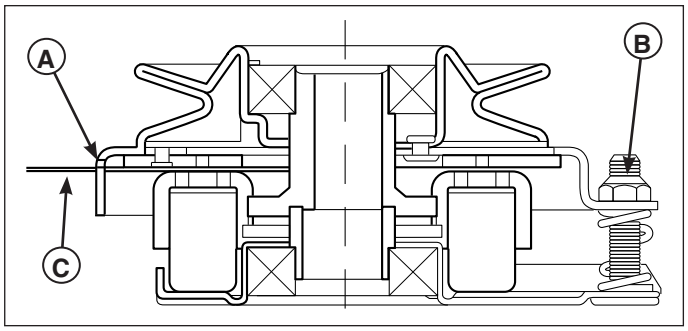

Figure 20. Adjust PTO Clutch
A. Window
B. Adjustment Nut
C. .016”-.018” (0,40-0,45mm) Feeler Gauge

PTO CLUTCH ADJUSTMENT

Check the PTO clutch adjustment after the initial 25 hour break-in period and then after every 100 hours of operation. Also perform the following procedure if the clutch is slipping or will not engage, or if a new clutch has been installed.

- Remove key from ignition switch and disconnect spark plug wires to prevent the possibility of accidental starting while the PTO is being adjusted.
- See Figure 19. Note the position of the 3 adjustment windows (A) in the side of the brake plate and the nylock adjustment nuts (B).
- Insert a .016”-.018” (0,40-0,45mm) feeler gauge (C) through each window, positioning the gauge between the rotor face and the armature face as shown in Figure 20.
- Alternately tighten the adjustment nuts (B, Figure 19) until the rotor face and armature face just contacts the gauge.
- Check the windows for an equal amount of tension when the gauge is inserted and removed, and make any necessary adjustments by tightening or loosening the adjustment nuts.

NOTE: The actual air gap between the rotor and armature may vary even after performing the adjustment procedure. This is due to dimensional variations on component parts, and is an acceptable condition.

- Check the mower blade stopping time. The mower blades and mower drive belt should come to a complete stop within five seconds after the electric PTO switch is turned off.

⚠WARNING

To avoid serious injury, perform adjustments only with engine stopped, key removed and unit on level ground.

Blade Brake Check

Mower blades and mower drive belt should come to a complete stop within five seconds after electric PTO switch is turned off.

- With PTO disengaged, start the engine.
- Remove the mower deck guard and observe the mower drive belt. Engage the PTO and wait several seconds. Disengage the PTO and check the amount of time it takes for the mower drive belt to stop.
- If the mower drive belt does not stop within five seconds, perform the PTO Clutch Adjustment. If the belt still does not stop within 5 seconds, see your dealer.

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